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Experiment 1]

1. Implement a java program to calculate gross salary and net salary taking the following data. Input: empno, empname, basic Process DA=70% of basic HRA=30% of basic CCA= Rs. 240/- PF=10% of basic PT=Rs.100/-

Code:

```
import java.util.*;
import java.io.*;
// java com.Main
class Exp1_1 {
  public static void main(String[] args)
  {

    Scanner sc = new Scanner(System.in);
    System.out.println("Hello World");
    int empno,cca=220,pt=100;
    float basic,da,hra,pf;
    String empname;
    System.out.print("Enter the Employee no: ");
    empno = sc.nextInt();
    System.out.print("Enter the Employee basic salary: ");
    basic = sc.nextFloat();
    System.out.println("Enter the Employees Name : ");
    empname = sc.nextLine();
    System.out.println(empno+" is the Empno"+basic+" is the Salary basic and
"+empname+" is the Employee name");
    da = 0.70f*basic;
    hra = 0.30f*basic;
    pf = 0.10f*basic;
    System.out.println("Your DA is "+da+"and HRA is "+hra+"also the PF is "+pf);
  }
}
```

Output :

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp1>java Exp1_1
Hello World
Enter the Employee no: 5
Enter the Employee basic salary: 150000
Enter the Employees Name :
5 is the Empno150000.0 is the Salary basic and  is the Employee name
Your DA is 105000.0and HRA is 45000.0also the PF is 15000.0
```

2. Write menu driven java program which will read a number and should implement following methods
i. Factorial ()
ii. testArmstrong ()
iii. testPalindrome ()

Code:

```
import java.util.*;
import java.io.*;
// import java.Math;
public class Main
{
  public static void main(String[] args) {
      int i,temp;
    Scanner sc = new Scanner(System.in);
    System.out.print("Your factorial is ");
    i = sc.nextInt();
    temp = factorial(i);
    System.out.println(temp);
        System.out.print("Enter the armstrong no:");
        i = sc.nextInt();
        armstrong(i);
        System.out.print("Enter the Palindrome no:");
        i = sc.nextInt();
        testPalindrome(i);
        System.out.print("Enter the no for prime:");
        i = sc.nextInt();
        String txt = testPrime(i);
        System.out.print(txt);

  }
  static int factorial(int i)
  {
```

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```
    if(i == 0)
    {
        return 1;
    }else
    {
        return i*factorial(i-1);
    }
}
static void armstrong(int i)
{
    int arm=0,temp,t;
    t = i;
    while(i!=0)
    {
      temp = i%10;
      i = i/10;
      arm += Math.pow(temp,3);
    }
    if(t==arm)
    {
        System.out.println("Your no " + arm + "is Armstrong ");
    }else
    {
        System.out.println("Your no "+arm+"is not a Armstrong");
    }
}
static void testPalindrome(int i)
{
    int pal=0,temp,t;
    t = i;
    int index = 0;
    while(i!=0)
    {
      index += 1;
      temp = i%10;
      i = i/10;
      pal += temp*Math.pow(10,index);
    }
```

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```
        if(t==pal)
        {
            System.out.println("Your no " + pal + "is a Palindrome ");
        }else
        {
            System.out.println("Your no "+ pal +"is not a Palindrome");
        }
    }
    static String testPrime(int i)
    {
        int count=1;
        if (i<0)
        {
            return "Not a possible solution";
        }
        while(count<(i/2)+1)
        {
            count += 1;
            if(i%count==0)
            {
               return "Not a prime no";
              //  return Integer.toString(count);
            }
        }
        return "A prime no";
    }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp1>java Main
Your factorial is 5
120
C:\Users\DELL\Desktop\Sem5\JSL\exp1>
```

```
C:\Users\DELL\Desktop\Sem5\JSL\exp1>java Main
Enter the armstrong no:153
Your no 153is Armstrong
```

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp1>java Main
Enter the Palindrome no:120
Your no 1200is not a Palindrome
```

```
C:\Users\DELL\Desktop\Sem5\JSL\exp1>java Main
Enter the no for prime:57
Not a prime no
C:\Users\DELL\Desktop\Sem5\JSL\exp1>java Main
Enter the no for prime:7
A prime no
```

3. Write a Java Program to take an integer N and print its first 10 multiples. Each multiple N * i (where 1<=i<=10) should be printed on a new line in the form: N x i = result.

Code:

```
import java.util.*;
import java.io.*;
public class exp1_4 {
 public static void main(String ars[])
 {
  int i,temp;
  Scanner sc = new Scanner(System.in);
  System.out.println("Enter the no whose multiple u want: ");
  i = sc.nextInt();
  for(int j=1;j<=10;j++)
  {
    System.out.println("Multiple of "+j+"is:"+j*i);
  }
 }
}
```

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp1>java exp1_4
Enter the no whose multiple u want:
9
Multiple of 1is:9
Multiple of 2is:18
Multiple of 3is:27
Multiple of 4is:36
Multiple of 5is:45
Multiple of 6is:54
Multiple of 7is:63
Multiple of 8is:72
Multiple of 9is:81
Multiple of 10is:90
```

4. Write a Java program to find the kth smallest and largest element in a given array. Elements in the array can be in any order. Expected Output:
Original Array:
[1, 4, 17, 7, 25, 3, 100]
K'th smallest element of the said array:
3
K'th largest element of the said array:
25
Code:

```
import java.util.*;
import java.io.*;
class exp1_5 {
  public static void main(String args[])
  {
    int i,n,temp,min=999999,max=0;
    Scanner sc = new Scanner(System.in);
    int[] a = {1,4,17,7,25,3,100};
    // System.out.println("Enter the no of elements in the array: ");
    // n = sc.nextInt();
    // for(int j=0;j<n;j++)
    // {
    //   System.out.print("Enter the "+j+"th element of the array: ");
```

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```
    //   a[j] = sc.nextInt();
    // }
    for(int j=0;j<a.length;j++)
    {
      System.out.print("Enter the "+j+"th element of the array: "+a[j]);
      System.out.println();
      // a[j] = sc.nextInt();
    }
    for(i=0;i<a.length;i++)
    {
      if(a[i]<min)
      {
        min = a[i];
      }
      if(a[i]>max)
      {
        max = a[i];
      }
    }
    System.out.println("The Minimum in the array list is : "+min);
    System.out.println("The Maximum in the array list is : "+max);
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp1>java exp1_5
Enter the 0th element of the array: 1
Enter the 1th element of the array: 4
Enter the 2th element of the array: 17
Enter the 3th element of the array: 7
Enter the 4th element of the array: 25
Enter the 5th element of the array: 3
Enter the 6th element of the array: 100
The Minimum in the array list is : 1
The Maximum in the array list is : 100
```

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Experiment 2]

I. Write a Java program to create a user-defined package and function to print a message for the users and import the same package in another program.

Code:

```
package exp2;
import java.util.*;
import java.io.*;
public class exp2_1 {
  public void show()
  {
    System.out.println("This is the package of exp2");
  }
  public static void main(String args[])
  {
    System.out.println("Making the obj");
    exp2_1 obj = new exp2_1();
    obj.show();
  }
}

import exp.exp2_1;
public class exp2 {
  public static void main(String args[])
  {
    exp2 obj = new exp2_1();
    obj.show();
  }
}
```

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp2>java exp2_1
Error: Could not find or load main class exp2_1
Caused by: java.lang.NoClassDefFoundError: exp2/exp2_1 (wrong name: exp2_1)

C:\Users\DELL\Desktop\Sem5\JSL\exp2>
```

```
C:\Users\DELL\Desktop\Sem5\JSL\exp2>java exp2
This is the package of exp2
```

II. Write a java program to create a user-defined package letmecalculate having class calculator and functions addition, subtraction, multiplication, division. Import this package in another program to use the class calculator.

Code:

```
package letmecalculate;

public class Caculate {
  public int add(int a,int b)
  {
    return a+b;
  }
  public int sub(int a,int b)
  {
    return a-b;
  }
  public int mul(int a,int b)
  {
    return a*b;
  }
  public int div(int a,int b)
  {
    return a/b;
  }
}
```

Calci.java

```
import letmecalculate.*;

public class calci {
  public static void main(String[] args) {
```

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```
    Calculate c = new Calculate();
    int a = c.add(5,6);
    int s = c.sub(5,6);
    int m = c.mul(5,6);
    int d = c.div(5,6);
    System.out.println(a+s+m+d);
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp2\example>javac calci.java
calci.java:5: error: cannot find symbol
    Calculate c = new Calculate();
    ^
  symbol:   class Calculate
  location: class calci
calci.java:5: error: cannot find symbol
    Calculate c = new Calculate();
                      ^
  symbol:   class Calculate
  location: class calci
2 errors

C:\Users\DELL\Desktop\Sem5\JSL\exp2\example>
```

III. Write a constructor in the Car class given below that initializes the brand class field with the string "Ford". Call the getBrand () method in the main method of the Sample class and store the value of the brand in a variable, and print the value.

Code:

```
class Car{
  String brands;
  public Car(String brand)
  {
    brands = brand;
  }
  public void displayCar()
  {
    System.out.println(this.brands);
  }
  public static void main(String[] args)
  {
    Car new_car = new Car("Ford");
```

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```
    new_car.displayCar();
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp2\example>java Car
Ford

C:\Users\DELL\Desktop\Sem5\JSL\exp2\example>
```

IV. Write a program to print the names of students by creating a Student class. If no name is passed while creating an object of Student class, then the name should be "Unknown", otherwise the name should be equal to the String value passed while creating object of Student class.

Code:

```
class Student {
  String student;
  public Student()
  {
    this.student = "Unknown";
  }
  public Student(String sd)
  {
    this.student = sd;
  }
  public void display()
  {
    System.out.println(this.student);
  }
  public static void main(String[] args) {
    Student st = new Student();
    st.display();
    Student s = new Student("Sarvagya");
    s.display();
  }
}
```

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Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp2\example>java Student
Unknown
Sarvagya
```

V. Write a Java class Complex for dealing with complex number. Your class must have the following features:
Instance variables:
o realPart for the real part of type double
o imaginaryPart for imaginary part of type double.
Constructor:
o public Complex (): A default constructor, it should initialize the number to 0, 0)
o public Complex (double realPart, double imaginaryPart): A constructor with parameters, it creates the complex object by setting the two fields to the passed values.
Instance methods:
o public void setRealPart (double realPart): Used to set the real part of this complex number.
o public void setImaginaryPart (double realPart): Used to set the imaginary part of this complex number.
o public double getRealPart (): This method returns the real part of the complex number
o public double getImaginaryPart (): This method returns the imaginary part of the complex number
Write a separate class ComplexDemo with a main () method and test the Complex class methods.

Code:

```
class Complex {
  double realPart,imaginaryPart;
  public Complex()
  {
    realPart = 0;
    imaginaryPart = 0;
  }
  public Complex(double rp,double ip)
  {
    realPart = rp;
    imaginaryPart = ip;
  }
  public void setRealPart(double rp)
  {
```

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```
    this.realPart = rp;
  }
  public void setImaginaryPart(double ip)
  {
    this.imaginaryPart = ip;
  }
  public double getRealPart()
  {
    return realPart;
  }
  public double getImaginaryPart()
  {
    return imaginaryPart;
  }
}
class ComplexDemo
{
  public static void main(String[] args) {
    Complex c = new Complex();
    double x = c.getRealPart();
    double y = c.getImaginaryPart();
    System.out.println("The value of x is " + x + "  and that of y is " + y);
    Complex c2 = new Complex(5.0,6.0);
    x = c2.getRealPart();
    y = c2.getImaginaryPart();
    System.out.println("The value of x is "+x+" and that of y is "+y);
    c2.setImaginaryPart(22.0);
    c2.setRealPart(22.0);
    x = c2.getRealPart();
    y = c2.getImaginaryPart();
    System.out.println("The value of x is "+x+" and that of y is "+y);

  }
}
```

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp2\example>javac complex.java

C:\Users\DELL\Desktop\Sem5\JSL\exp2\example>java ComplexDemo
The value of x is 0.0  and that of y is 0.0
The value of x is 5.0 and that of y is 6.0
The value of x is 22.0 and that of y is 22.0

C:\Users\DELL\Desktop\Sem5\JSL\exp2\example>
```

VI. Create a class named 'Student' with String variable 'name' and integer variable 'roll_no'. Assign the value of roll_no as '2' and that of name as "John" by creating an object of the class Student.

Code:

```
class Student {
  String name;
  int roll_no;
  public Student(String n,int roll)
  {
    this.name = n;
    this.roll_no = roll;
  }
  public void display()
  {
    System.out.println("The Students name is "+this.name+" and theirs roll no is
"+ this.roll_no);
  }
  public static void main(String[] args) {
    Student s = new Student("Sarvagya",30);
    s.display();
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp2\example>java Student
The Students name is Sarvagya and theirs roll no is 30
```

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Experiment - 3]

I. WAP to find whether the entered 4 digit number is vampire or not. Combination of digits from this number forms 2-digit number. When they are multiplied by each other we get the original number. (1260=21*60, 1395=15*93, 1530=30*51)

Code :

```
// Java program for Vampire
import java.util.*;
import java.io.*;
class Vampire{
  public void Vamp(int a)
  {
    int temp,b=a,mul1,mul2;
    int[] arr = new int[4];
    int[] index = {0,1,2,3};
    int n,m,t = 0,done = 0;

    for(int i=0;i<4;i++)
    {
      temp = a%10;
      arr[i] = temp;
      a = a/10;
    }

    for(int i=0;i<4;i++)
    {
      // System.out.println(arr[i]);
    }

    for(int i=0;i<4;i++)
    {
      // if(arr[i]==0)
      // {
      //   continue;
      // }
```

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```
      for(int j=0;j<4;j++)
      {
        n = m =-1;
        if (i==j)
        {
          continue;
        }
        System.out.print(Integer.toString(arr[i])+arr[j]);
        // System.out.print(Integer.toString(i)+j);

        for(int k=0;k<4;k++)
        {
          if ((index[k] == i) || (index[k] == j))
          {
            continue;
          }
          if(n==-1)
          {
            n = arr[k];
            continue;
          }
          if(m==-1)
          {
            m = arr[k];
          }
        }

        System.out.println(" "+Integer.toString(n)+m);
        // System.out.print(" "+Integer.toString(n)+m);
        mul1 = ((arr[i]*10)+arr[j]) * ((n*10)+m);
        mul2 = ((arr[i]*10)+arr[j]) * (m+n*10);
        if ((b == mul1) || (b==mul2))
        {
          System.out.println("Your 4 digits no is a vampire no ");
          return;
        }
      }
    }
```

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```
    System.out.println("Your 4 digits no is not a vampire no");
  }
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    System.out.println("Enter the no for Vampire:");
    int a = sc.nextInt();
    Vampire v = new Vampire();
    v.Vamp(a);
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp3>java Vampire
Enter the no for Vampire:
1212
21 21
22 11
21 12
12 21
12 21
11 22
22 11
21 21
21 21
12 12
11 22
12 21
Your 4 digits no is not a vampire no
```

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp3>java Vampire
Enter the no for Vampire:
1260
60 21
Your 4 digits no is a vampire no

C:\Users\DELL\Desktop\Sem5\JSL\exp3>java Vampire
Enter the no for Vampire:
1395
59 31
53 91
51 93
95 31
93 51
91 53
35 91
39 51
31 59
15 93
Your 4 digits no is a vampire no
```

ii.WAP to display the following using irregular arrays
1
2 3
4 5 6
Code:

```
class Display {
  public static void main(String[] args) {
    int[] arr = {1,2,3,4,5,6};
    int count = 0;
    for(int i=0;i<arr.length/2;i++)
    {
      for(int j=0;j<=i;j++)
      {
        System.out.print(arr[count] + "  ");
        count += 1;
      }
      System.out.println();
    }
  }
}
```

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Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp3>java Display
1
2  3
4  5  6

C:\Users\DELL\Desktop\Sem5\JSL\exp3>
```

iii.WAP a java program for the following problem statement You have been given an array of positive integers A1,A2,...,An with legnth N and you have to print an array of same legnth(N) where the values in the new array are the sum of every number in the array, except the number at that index. Input: The first line of input contains a single integer T denoting the number of test cases. Each test cases contain two lines.First line contains N, the length of the array and second line contains N space separated positive integers. Output: For each test case, output a single array of same length. Constraints: 1 ≤ T ≤ 100 1 ≤ N ≤105 0 <= A[i] <= 109 Example: Input 2 4 1 2 3 4 3 4 5 6 Output 9 8 7 6 11 10 9

Code:

```
import java.util.*;
class ArraySum {
  public static void main(String[] args) {
    int T,n,at;
    Scanner sc = new Scanner(System.in);

    System.out.println("Enter the no of times u want to perform the operation:");
    at = sc.nextInt();
    System.out.println("Enter the no of elements u want:");
    n = sc.nextInt();
    int a[] = new int[n];
    int b[] = new int[n];
    for(int k=0;k<at;k++)
    {
      System.out.println("Enter the elements of the array: ");
      for(int i = 0;i<n;i++)
      {
        a[i] = sc.nextInt();
```

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```
      }
      for(int i=0;i<n;i++)
      {
        T = 0;
        for(int j=0;j<n;j++)
        {
          if (i==j)
          {
            continue;
          }
          T += a[j];
        }
        b[i] = T;
      }
      System.out.println("The expected output u wanted:");
      for(int i=0;i<n;i++)
      {
        System.out.println(b[i]);
      }
    }

  }
}
```

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp3>java ArraySum
Enter the no of times u want to perform the operation:
2
Enter the no of elements u want:
4
Enter the elements of the array:
1 2 3 4
The expected output u wanted:
9
8
7
6
Enter the elements of the array:
3
4
5
6
The expected output u wanted:
15
14
13
12
```

iv.WAP that accepts a shopping list of items and performs the following operations: Add an item at a specified location, delete an item in the list, and print the contents of the vector

Code:

```
// import java.util.*;
import java.util.Vector;
import java.util.Scanner;
class Vecto {
  Vector<String> vect = new Vector<>();

  void addItem(String item)
  {
    this.vect.add(item);
  }
  void addItemAtPos(String item,int ind)
  {
    this.vect.add(ind ,item);
  }
```

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```
void deleteItem(int item)
{
  this.vect.remove(item);
}
void printAllItems()
{
  for(int i=0;i<vect.size();i++)
  {
    System.out.println(this.vect.get(i));
  }
}

public static void main(String[] args) {
  int t,n,flag=1;
  String item;
  Vecto v = new Vecto();
  Scanner sc = new Scanner(System.in);
  do {
    System.out.println("1. Append an item");
    System.out.println("2. Add an item at an position");
    System.out.println("3. Delete an item");
    System.out.println("4. Display all of the items ");
    n = sc.nextInt();
    switch(n)
    {
      case 1:
        System.out.println("Enter the item :");
        item = sc.next();
        v.addItem(item);
        break;
      case 2:
        System.out.println("Enter the item and the position: ");
        t = sc.nextInt();
        System.out.println("Enter the item :");
        item = sc.next();
        v.addItemAtPos(item,t);
        break;
      case 3:
```

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```
          System.out.println("Enter the item u want to delete");
          t = sc.nextInt();
          v.deleteItem(t);
          break;
        case 4:
          System.out.println("Displaying all elements:");
          v.printAllItems();
          break;
        default:
          System.out.println("Not a valid choice");
          break;
      }
      System.out.println("Add more item or not (1==yes)/(0==no)");
      flag = sc.nextInt();
    }while(flag==1);
    sc.close();
  }
}
```

Output:

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp3>java Vecto
1. Append an item
2. Add an item at an position
3. Delete an item
4. Display all of the items
1
Enter the item :
56
Add more item or not (1==yes)/(0==no)
1
1. Append an item
2. Add an item at an position
3. Delete an item
4. Display all of the items
1
Enter the item :
32
Add more item or not (1==yes)/(0==no)
1
1. Append an item
2. Add an item at an position
3. Delete an item
4. Display all of the items
1
Enter the item :
98
Add more item or not (1==yes)/(0==no)
1
1. Append an item
2. Add an item at an position
3. Delete an item
4. Display all of the items
2
```

```
4
Displaying all elements:
56
32
23
98
Add more item or not (1==yes)/(0==no)
```

v.Write a java programs to find frequency of an element in the given Vector array

Code :

```
import java.util.*;
class Freq {
```

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```
  public static void main(String[] args) {
    Vector<Integer> vect = new Vector<>();
    Scanner sc = new Scanner(System.in);
    int n,ele;
    System.out.println("Enter the no of elements: ");
    n = sc.nextInt();
    for(int i=0;i<n;i++)
    {
      ele = sc.nextInt();
      vect.add(ele);
    }
    int count,flag=1;
    do
    {
      count = 0;
      System.out.println("Enter the elements whose freq. u want:");
      ele = sc.nextInt();
      for(int i=0;i<n;i++)
      {
        if (ele == vect.get(i))
        {
          count += 1;
        }
      }
      System.out.print("The Frequency u wanted: "+count);
      System.out.println("If u want to continue then press 1:");
      flag = sc.nextInt();
    }while(flag==1);
    sc.close();
  }
}
```

Ouput:

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp3>java Freq
Enter the no of elements:
5
2
3
6
6
2
Enter the elements whose freq. u want:
2
The Frequency u wanted: 2If u want to continue then press 1:
1
Enter the elements whose freq. u want:
6
The Frequency u wanted: 2If u want to continue then press 1:
1
Enter the elements whose freq. u want:
5
The Frequency u wanted: 0If u want to continue then press 1:
```

vi.WAP to check if 2 strings are Meta strings or not. Meta strings are the strings which can be made equal by exactly one swap in any of the strings. Equal string are not considered here as Meta strings. Example: str1 = "geeks", str2 = "keegs" By just swapping 'k' and 'g' in any of string, both will become same. Example: str1 = "Converse", str2 = "Conserve" By just swapping 'v' and's' in any of string, both will become same. Algorithm (if reqd): 1. Check if both strings are of equal length or not, if not return false. 2. Otherwise, start comparing both strings and count number of unmatched characters and also store the index of unmatched characters. 3. If unmatched characters are more than 2 then return false. 4. Otherwise check if on swapping any of these two characters in any string would make the string equal or not. 5. If yes then return true. Otherwise return false.

Code:

```java
import java.util.*;
class Metaa {
  public static void main(String[] args) {
    Vector<String> vect = new Vector<>();
    Scanner sc = new Scanner(System.in);
    String txt;
    int flag = 0;
```

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```
    System.out.println("Enter the txt u want to check for Meta : ");
    txt = sc.next();
    vect.add(txt);
    System.out.println("Enter the second txt u want to check for Meta : ");
    txt = sc.next();
    vect.add(txt);

    txt = vect.get(1);
    char[] text = new char[txt.length()];
    char[] text2 = new char[txt.length()];
    String txt2;
    char temp;

    for(int i=0;i<txt.length();i++)
    {
      text[i] = txt.charAt(i);
      text2[i] = txt.charAt(i);
    }
    int z = txt.length() -1;
    // System.out.println(txt.length());
    for(int i=0;i<z;i++)
    {
      for(int j=i+1;j<z;j++)
      {
        txt2 = "";
        temp = text[i];
        text[i] = text[j];
        text[j] = temp;
        for(int k=0;k<z;k++)
        {
          txt2 += text[i];
        }
        if(txt2 == txt)
        {
          System.out.println("The given string is META string");
          flag = 1;
          break;
        }
```

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```
        for(i=0;i<z;i++)
        {
          text[i] = text2[i];
        }
      }
    }
    if(flag==0)
    {
      System.out.println("The given string is not a META string");
    }
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp3>java Metaa
Enter the txt u want to check for Meta :
geeks
Enter the second txt u want to check for Meta :
keegs
The given string is META string
```

vii.Write a java program to count number of alphabets, digits, special symbols, blank spaces and words from the given sentence. Also count number of vowels and consonants

Code:

```
import java.util.Scanner;

class Count {
  public static void main(String[] args) {
    Scanner sc = new Scanner(System.in);
    String str;
    int alpha = 0, digit = 0, sp = 0, blank = 0, words = 0, flag = 0;
    System.out.print("Enter a string: ");
    str = sc.nextLine();
    for (int i = 0; i < str.length(); i++) {
      if ((str.charAt(i) >= 'a' && str.charAt(i) <= 'z') ||
          (str.charAt(i) >= 'A' && str.charAt(i) <= 'Z')) {
        alpha++;
      } else if (str.charAt(i) >= '0' && str.charAt(i) <= '9') {
```

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```
        digit++;
      } else if (str.charAt(i) == 32) {
        blank++;
        words++;
        if (i + 1 < str.length()) {
          flag = 1;
        } else {
          flag = 0;
        }
      } else {
        sp++;
      }
    }
    if (flag == 1) {
      words++;
    }
    System.out.println("Alphabets: " + alpha);
    System.out.println("Digits: " + digit);
    System.out.println("Spaces: " + blank);
    System.out.println("Words: " + words);
    sc.close();
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp3>java Count
Enter a string: Sarvy is the 899846
Alphabets: 10
Digits: 6
Spaces: 3
Words: 4

C:\Users\DELL\Desktop\Sem5\JSL\exp3>
```

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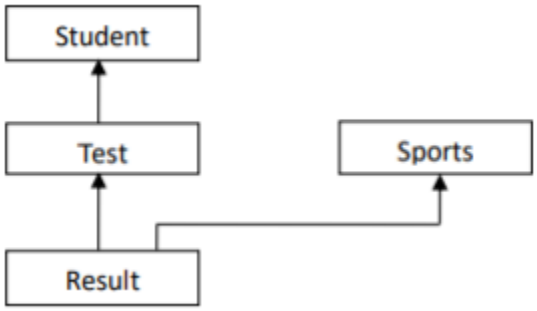
Experiment 4]

i. WAP to implement three classes namely Student, Test and Result. Student class has member as rollno, Test class has members as sem1_marks and sem2_marks and Result class has member as total. Create an interface named sports that has a member score (). Derive Test class from Student and Result class has multiple inheritances from Test and Sports. Total is formula based on sem1_marks, sem2_mark and score.



Code :

```
class Student
{
  int roll_no;
  public Student(int r)
  {
    roll_no = r;
  }
}

class Test extends Student
{
  int sem1_marks,sem2_marks;
  public Test(int s1,int s2,int r)
  {
    super(r);
    sem1_marks = s1;
    sem2_marks = s2;
  }
}
```

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```
interface Sports
{
  void score();
}

class Result extends Test implements Sports
{
  int total,sc ;
  public Result(int s1,int s2,int r,int sc){
    super(s1,s2,r);
    this.sc =sc;
  }
  @Override
  public void score()
  {
    System.out.println("Score = "+sc);
  }
  int total_marks()
  {
    int total = super.sem1_marks + super.sem2_marks + sc;
    return total;
  }
}

class School
{
  public static void main(String[] args) {
    Student s = new Student(14);
    Result res = new Result(15,25,14,5);
    System.out.println("Total marks are = "+res.total_marks());
    System.out.println(s.roll_no);
  }
}
```

Output:

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp4>java School
Total marks are = 45
14

C:\Users\DELL\Desktop\Sem5\JSL\exp4>
```

ii. Write an abstract class program to calculate area of circle, rectangle and triangle

Code :

```
abstract class Calculate {
  abstract void circle(float r);

  abstract void rectangle(int l, int b);

  abstract void trinagle(float l, float b);
}

class calc_area extends Calculate {
  void circle(float r) {
    System.out.println("Area of circle is " + (22 * r * r / 7));
  }

  void rectangle(int l, int b) {
    System.out.println("Area of rectangle is " + (l * b));
  }

  void trinagle(float l, float b) {
    System.out.println("Area of triangle is " + (l * b / 2));
  }
}

class Area {
  public static void main(String[] args) {
    calc_area c = new calc_area();
    c.circle(3);
    c.rectangle(2, 4);
    c.trinagle(5, 2);
```

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```
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp4>java Area
Area of circle is 28.285715
Area of rectangle is 8
Area of triangle is 5.0

C:\Users\DELL\Desktop\Sem5\JSL\exp4>
```

iii. Create the Account class Account.java and write a main method in a different class to briefly experiment with some instances of the Account class. Using the Account class as a base class, write two derived classes called SavingsAccount and CurrentAccount. A SavingsAccount object, in addition to the attributes of an Account object, should have an interest variable and a method which adds interest to the account. A CurrentAccount object, in addition to the attributes of an Account object, should have an overdraft limit variable. Ensure that you have overridden methods of the Account class as necessary in both derived classes. Now create a Bank class, an object of which contains an array of Account objects. Accounts in the array could be instances of the Account class, the SavingsAccount class, or the CurrentAccount class. Create some test accounts (some of each type). Write an update method in the bank class. It iterates through each account, updating it in the following ways: Savings accounts get interest added (via the method you already wrote); CurrentAccounts get a letter sent if they are in overdraft. The Bank class requires methods for opening and closing accounts, and for paying a dividend into each account. Hints: Note that the balance of an account may only be modified through the deposit(double) and withdraw(double) methods.
The Account class should not need to be modified at all. Be sure to test what you have done after each step.

Code :

```
class Account {
  String name;
  double amount;

  Account(String n, double a) {
    name = n;
    amount = a;
```

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```
  }

  void deposit(double a) {
    amount += a;
  }

  void withdraw(double a) {
    amount -= a;
    System.out.println("Balance = " + amount);
  }
}

class SavingsAccount extends Account {
  double interest;

  SavingsAccount(String name, double amm) {
    super(name, amm);
    interest = 2.5;
  }

  void addInterest() {
    super.amount = super.amount + super.amount * interest / 100;
  }
}

class CurrentAccount extends Account {
  double limit;

  CurrentAccount(String name, double amm) {
    super(name, amm);
    limit = 10000;
  }

  void deposit(double a) {
    amount += a;
    // checkOverdraft();
    System.out.println("Balance = " + amount);
  }
```

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```
  void withdraw(double a) {
    amount -= a;
    // checkOverdraft();
    System.out.println("Balance = " + amount);
  }

  void checkOverdraft() {
    if (amount > limit || amount < 0) {
      System.out.println("Overdraft limit reached.");
    }
  }
}

class Bank {
  Account arr[] = new Account[10];

  void update() {
    System.out.println("Account Details");
    for (Account act : arr) {
      if (act == null)
        continue;
      System.out.println("Name:" + act.name);
      if (act instanceof SavingsAccount) {
        SavingsAccount savings_account = ((SavingsAccount) act);
        savings_account.addInterest();
      } else if (act instanceof CurrentAccount) {
        CurrentAccount current_account = ((CurrentAccount) act);
        current_account.checkOverdraft();
      }
      System.out.println("Balance:" + act.amount);
    }
  }

  void initialize() {
    arr[0] = new Account("Harshit", 2000);
    arr[1] = (Account) new SavingsAccount("Shubham", 2500);
    arr[2] = new CurrentAccount("Aditya", 3000);
```

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```
    // SavingsAccount a = (SavingsAccount) arr[1];
    CurrentAccount b = (CurrentAccount) arr[2];
    System.out.println("At Initialization: ");
    for (int i = 0; i < 3; i++) {
      System.out.println(arr[i].name);
      System.out.println(arr[i].amount);
    }
    // System.out.println(arr[1].name);
    // a.addInterest();
    // System.out.println(a.amount);
    b.deposit(5000);
    b.withdraw(15000);
  }

  public static void main(String[] args) {
    Bank b = new Bank();
    b.initialize();
    b.update();
  }
}
```

Output :

```
Balance = -7000.0
Account Details
Name:Harshit
Balance:2000.0
Name:Shubham
Balance:2562.5
Name:Aditya
Overdraft limit reached.
Balance:-7000.0

C:\Users\DELL\Desktop\Sem5\JSL\exp4>
```

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iv. Create a class called Employee whose objects are records for an employee. This class will be a derived class of the class Person which you will have to copy into a file of your own and compile. An employee record has an employee's name (inherited from the class Person), an annual salary represented as a single value of type double, a year the employee started work as a single value of type int and a national insurance number, which is a value of type String. Your class should have a reasonable number of constructors and accessor methods, as well as an equals method. Write another class containing a main method to fully test your class definition

Code :

```
class Person {
  String name;

  Person(String name) {
    this.name = name;
  }
}

class Employee extends Person {
  double salary;
  int year;
  String ins_no;

  Employee(String name, double salary, int year, String ins_no) {
    super(name);
    this.salary = salary;
    this.year = year;
    this.ins_no = ins_no;
  }

  boolean is_same(String n) {
    if (n == name) {
      return true;
    }
    return false;
  }
}

class Main {
```

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```
  public static void main(String[] args) {
    Employee E = new Employee("Sarvagya", 25000, 2022, "1234");
    System.out.println(E.is_same("Sarvayga"));
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp4>java Main
true

C:\Users\DELL\Desktop\Sem5\JSL\exp4>
```

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Experiment 5]

ii.Write a Java Program to input the data through command Line and Find out total valid and in-valid integers. (Hint: use exception handling)

Code:

```
import java.util.InputMismatchException;
import java.util.Scanner;
class Valid {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int a[] = new int[10];
        int n;
        int error = 0;
        System.out.print("Enter no. of inputs: ");
        n = sc.nextInt();
        for (int i = 0; i < n; i++) {
            try {
                a[i] = sc.nextInt();
            } catch (InputMismatchException e) {
                error++;
            }
            sc.nextLine();
        }
        System.out.println("Invalid Integers = " + error);
        System.out.println("Valid Integers = " + (n - error));

        sc.close();
    }
}
```

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp5>java Valid
Enter no. of inputs: 5
4
9
8
2
6
Invalid Integers = 0
Valid Integers = 5
```

iii.Write a Java Program to calculate the Result. Result should consist of name, seatno, date, center number and marks of semester three exam. Create a User Defined Exception class MarksOutOfBoundsException, If Entered marks of any subject is greater than 100 or less than 0, and then program should create a user defined Exception of type MarksOutOfBoundsException and must have a provision to handle it

Code:

```
class MarksOutOfBoundException extends Exception {
  public MarksOutOfBoundException(String s) {
      super(s);
  }
}

class Result {

  static void validate(int marks) throws MarksOutOfBoundException {
      if (marks < 0 || marks > 100) {
          throw new MarksOutOfBoundException("Invalid Marks");
      } else {
          System.out.println("Valid Marks");
      }
  }

  public static void main(String[] args) {
      try {
          validate(105);
      } catch (MarksOutOfBoundException e) {
          // TODO: handle exception
          System.out.println("Caught!!!");
          System.out.println("Caught Exception: " + e);
      }
```

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```
  }
}
```

Output:

```
C:\Users\DELL\Desktop\Sem5\JSL\exp5>java Result
Caught!!!
Caught Exception: MarksOutOfBoundException: Invalid Marks
```

iii.Write a Java Program to calculate the Result. Result should consist of name, seatno, date, center number and marks of semester three exam. Create a User Defined Exception class MarksOutOfBoundsException, If Entered marks of any subject is greater than 100 or less than 0, and then program should create a user defined Exception of type MarksOutOfBoundsException and must have a provision to handle it

Code:

```
class MyThread extends Thread {
  int n;
  long start, end;

  MyThread(int n) {
      this.n = n;
  }

  public void run() {
      start = System.currentTimeMillis();
      for (int i = 1; i < 11; i++) {
          System.out.println(n + "*" + i + "=" + (n * i));
      }
      end = System.currentTimeMillis();
      System.out.println("Time of "+this.getName()+" is: "+(end-start)+"
milli-sec");
  }
}

class Table {
  public static void main(String[] args) {
      MyThread t1 = new MyThread(5);
```

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```
      MyThread t2 = new MyThread(7);
      MyThread t3 = new MyThread(13);
      // long start1, start2, start3, end1, end2, end3;
      // start1 = System.currentTimeMillis();
      t1.start();
      // end1 = System.currentTimeMillis();
      t2.start();
      t3.start();

  }
}
```

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```
C:\Users\DELL\Desktop\Sem5\JSL\exp5>java T
13*1=13
13*2=26
13*3=39
13*4=52
7*1=7
5*1=5
5*2=10
5*3=15
13*5=65
13*6=78
13*7=91
13*8=104
13*9=117
13*10=130
7*2=14
5*4=20
5*5=25
5*6=30
5*7=35
7*3=21
7*4=28
7*5=35
5*8=40
7*6=42
5*9=45
5*10=50
7*7=49
7*8=56
Time of Thread-2 is: 53 milli-sec
Time of Thread-0 is: 93 milli-sec
7*9=63
```

v.Write java program to implement the concept of Thread Synchronization.

Code :

```
class MyThread extends Thread {
  int available = 1;

  synchronized public void run() {
      if (available > 0) {
          System.out.println(this.getName() + " has Booked ticket");
          available -= 1;
      } else {
```

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```
            System.out.println("Houseful!");
        }
    }
}

class Synchronized {
    public static void main(String[] args) {
        MyThread t1 = new MyThread();
        Thread t2 = new Thread(t1);
        Thread t3 = new Thread(t1);
        t2.start();
        t3.start();
    }
}
```

Output :

```
C:\Users\DELL\Desktop\Sem5\JSL\exp5>java Synchronized
Thread-0 has Booked ticket
Houseful!

C:\Users\DELL\Desktop\Sem5\JSL\exp5>
```

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Experiment 6]

i. Write a program to create a window with four text fields for the name, street, city and pin code with suitable labels. Also windows contain a button MyInfo. When the user types the name, his street, city and pincode and then clicks the button, the types details must appear in Arial Font with Size 32, Italics.

Code:

```
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JLabel;
import javax.swing.JTextField;
import java.awt.event.*;
import java.awt.Color;
import java.awt.Font;

class PersonalInfo {
  public static void main(String[] args) {
    JFrame f = new JFrame("Personal Information");
    JButton b1 = new JButton("MyInfo");
    JLabel l1 = new JLabel("Name: ");
    JLabel l2 = new JLabel("Street: ");
    JLabel l3 = new JLabel("City: ");
    JLabel l4 = new JLabel("Pin Code: ");
    JLabel l5 = new JLabel();
    JLabel l6 = new JLabel();
    JLabel l7 = new JLabel();
    JLabel l8 = new JLabel();
    JTextField tf1 = new JTextField();
    JTextField tf2 = new JTextField();
    JTextField tf3 = new JTextField();
    JTextField tf4 = new JTextField();
    b1.setBounds(80, 180, 100, 50);
    b1.addActionListener(new ActionListener() {
      public void actionPerformed(ActionEvent e) {
        l5.setText(tf1.getText());
        l6.setText(tf2.getText());
        l7.setText(tf3.getText());
        l8.setText(tf4.getText());
```

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```
        l5.setFont(new Font("Arial", Font.PLAIN, 32));
        l6.setFont(new Font("Arial", Font.PLAIN, 32));
        l7.setFont(new Font("Arial", Font.PLAIN, 32));
        l8.setFont(new Font("Arial", Font.PLAIN, 32));
        b1.setBackground(Color.CYAN);
      }
    });
    l1.setBounds(20, 20, 100, 20);
    l2.setBounds(20, 60, 100, 20);
    l3.setBounds(20, 100, 100, 20);
    l4.setBounds(20, 140, 100, 20);
    l5.setBounds(20, 250, 200, 75);
    l6.setBounds(20, 290, 200, 75);
    l7.setBounds(20, 330, 200, 75);
    l8.setBounds(20, 370, 200, 75);
    tf1.setBounds(100, 20, 150, 20);
    tf2.setBounds(100, 60, 150, 20);
    tf3.setBounds(100, 100, 150, 20);
    tf4.setBounds(100, 140, 150, 20);
    f.add(l1);
    f.add(l2);
    f.add(l3);
    f.add(l4);
    f.add(l5);
    f.add(l6);
    f.add(l7);
    f.add(l8);
    f.add(tf1);
    f.add(tf2);
    f.add(tf3);
    f.add(tf4);
    f.add(b1);
    f.setSize(400, 550);
    f.setLayout(null);
    f.setVisible(true);
  }
}
```

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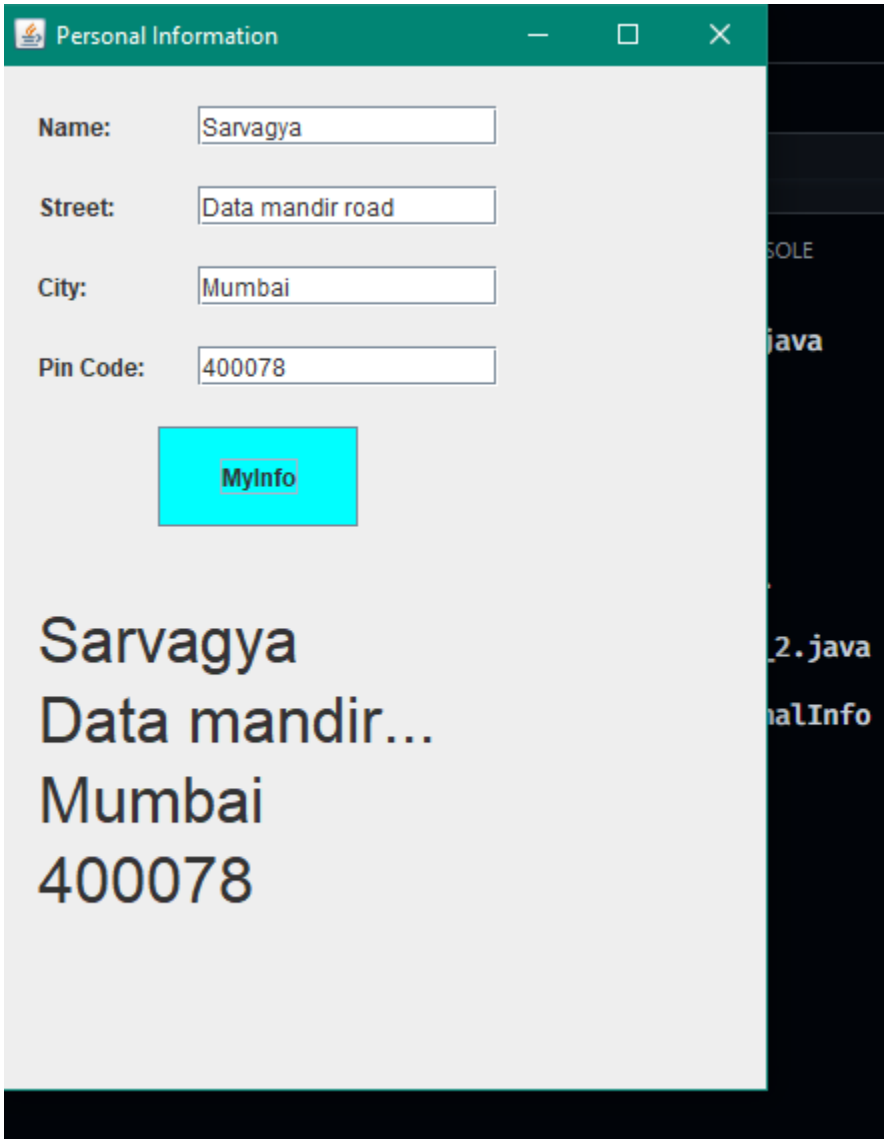
Output:



ii. WA applet with 4 swing buttons with suitable texts on them. When the user presses a button a message should appear in the label as to which button was pressed by the user

Code:

```
import javax.swing.JButton;
import javax.swing.JFrame;
// import javax.swing.JPanel;
import javax.swing.JLabel;
import java.awt.event.*;

class Message {
  public static void main(String[] args) {
    JFrame f = new JFrame();
```

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```
    JButton b1 = new JButton("Click Me!");
    JButton b2 = new JButton("No! Click Me!");
    JButton b3 = new JButton("Please, Click Me!");
    JButton b4 = new JButton("Click Me Frist!");
    JLabel l1 = new JLabel();
    JLabel l2 = new JLabel();
    JLabel l3 = new JLabel();
    JLabel l4 = new JLabel();
    b1.setBounds(20, 20, 100, 30);
    b1.addActionListener(new ActionListener() {
      public void actionPerformed(ActionEvent e) {
        l2.setVisible(false);
        l3.setVisible(false);
        l4.setVisible(false);
        l1.setText("Thankyou for clicking me!");
        l1.setVisible(true);
      }
    });
    b2.setBounds(130, 20, 110, 30);
    b2.addActionListener(new ActionListener() {
      public void actionPerformed(ActionEvent e) {
        l1.setVisible(false);
        l3.setVisible(false);
        l4.setVisible(false);
        l2.setText("Thankyou for not clicking first button!");
        l2.setVisible(true);
      }
    });
    b3.setBounds(250, 20, 140, 30);
    b3.addActionListener(new ActionListener() {
      public void actionPerformed(ActionEvent e) {
        l1.setVisible(false);
        l2.setVisible(false);
        l4.setVisible(false);
        l3.setText("You are my friend!!!");
        l3.setVisible(true);
      }
    });
    b4.setBounds(400, 20, 130, 30);
    b4.addActionListener(new ActionListener() {
      public void actionPerformed(ActionEvent e) {
        l1.setVisible(false);
```

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```
        l2.setVisible(false);
        l3.setVisible(false);
        l4.setText("NOW YOU WILL PASS YOUR EXAM!!!");
        l4.setVisible(true);
      }
    });
    l1.setBounds(20, 50, 300, 30);
    l2.setBounds(20, 50, 300, 30);
    l3.setBounds(20, 50, 300, 30);
    l4.setBounds(20, 50, 300, 30);
    f.add(b1);
    f.add(b2);
    f.add(b3);
    f.add(b4);
    f.add(l1);
    f.add(l2);
    f.add(l3);
    f.add(l4);
    f.setSize(560, 400);
    f.setLayout(null);
    f.setVisible(true);
  }
}
```

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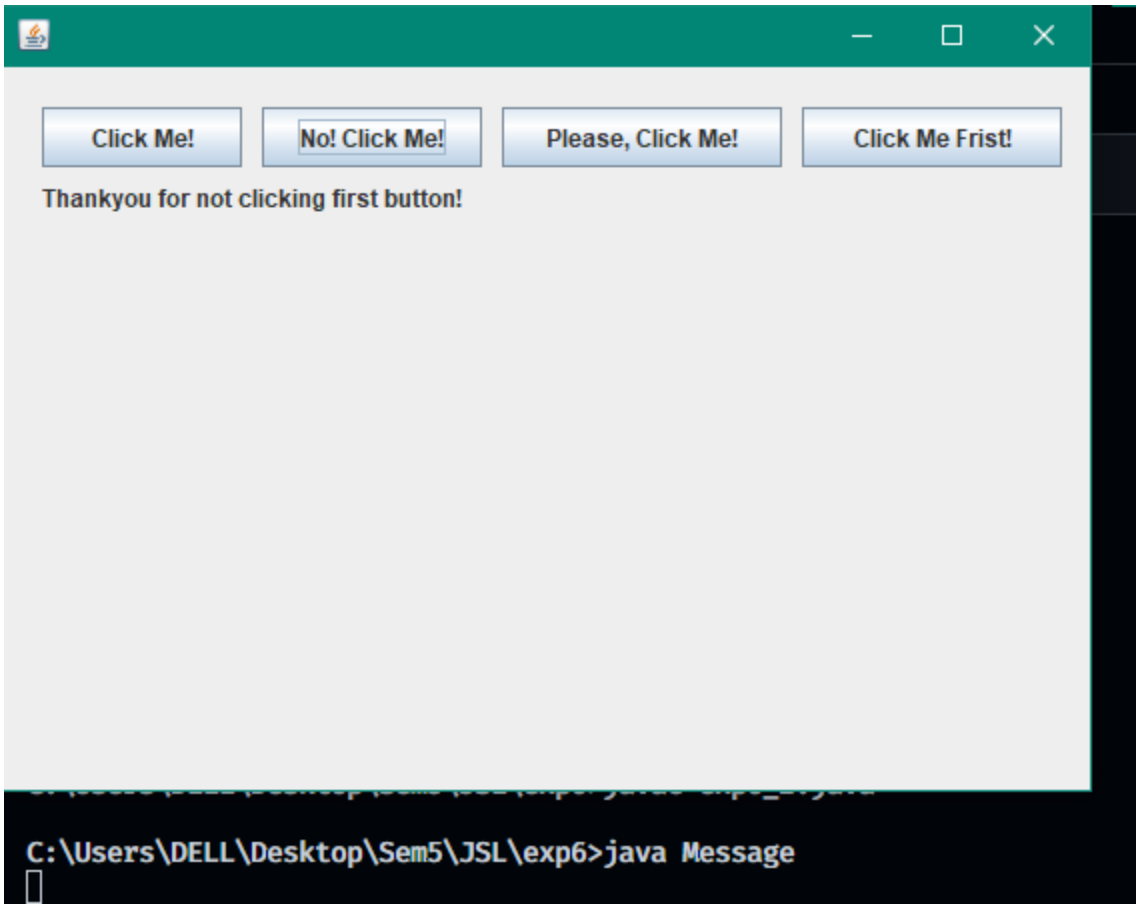

iii. Write java program to create a registration form using AWT

Code:

```
import java.awt.*;
import java.awt.event.*;

class Form {
  public static void main(String[] args) {
    Frame f = new Frame("Registration Form");
    Font name_font = new Font("arial", Font.PLAIN, 15);
    Label l_title = new Label("Registration Form");
    Label l_name = new Label("Name: ");
    Label l_sur = new Label("Surname: ");
    Label l_gender = new Label("Gender: ");
    Label msg = new Label("Form has been Submitted.");
    TextField t_name = new TextField();
    TextField t_sur = new TextField();
    CheckboxGroup cbg = new CheckboxGroup();
    Checkbox male = new Checkbox("Male", true, cbg);
    Checkbox female = new Checkbox("Female", true, cbg);
```

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```
    Button b = new Button("SUBMIT");
    Dialog d = new Dialog(f, "Alert!");
    l_title.setBounds(30, 40, 200, 30);
    l_title.setFont(new Font("arial", Font.BOLD, 22));
    l_name.setBounds(30, 80, 100, 20);
    l_name.setFont(name_font);
    l_sur.setBounds(30, 110, 100, 20);
    l_sur.setFont(name_font);
    l_gender.setBounds(30, 140, 100, 20);
    l_gender.setFont(name_font);
    t_name.setBounds(150, 80, 200, 20);
    t_sur.setBounds(150, 110, 200, 20);
    male.setBounds(150, 140, 100, 20);
    female.setBounds(260, 140, 100, 20);
    b.setBounds(125, 170, 100, 30);
    b.setBackground(new Color(255, 204, 203));
    b.addActionListener(new ActionListener() {
      public void actionPerformed(ActionEvent e) {
        msg.setBounds(20, 40, 200, 20);
        d.add(msg);
        d.setSize(300, 100);
        d.setLayout(null);
        d.setVisible(true);
        d.addWindowListener(new WindowAdapter() {
          public void windowClosing(WindowEvent w) {
            d.setVisible(false);
          }
        });
      }
    });
    f.add(l_title);
    f.add(l_name);
    f.add(l_sur);
    f.add(l_gender);
    f.add(t_name);
    f.add(t_sur);
    f.add(male);
    f.add(female);
    f.add(b);
    f.addWindowListener(new WindowAdapter() {
      public void windowClosing(WindowEvent w) {
        System.exit(0);
```

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```
      }
    });
    f.setBackground(new Color(244, 226, 198));
    f.setSize(400, 300);
    f.setLayout(null);
    f.setVisible(true);
    f.setResizable(false);
  }
}
```

Output: